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IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re the Application of

Inventors: Kiyotaka KOBAYASHI, et al.

Appln. No.: 10/566,682

Filed: February 1, 2006

For: RADIO TRANSMITTING APPARATUS AND RADIO
TRANSMISSION METHOD

PETITION TO MAKE SPECIAL

Assistant Commissioner of Patents
Washington, DC 20231

07/26/2006 HDESTA1 00000063 194375 10566682

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Sir:

The Applicants respectfully petition that the above-captioned application be granted special status. The requirements of MPEP section 708.02(VIII) are complied with as follows:

(1) The petition fee set forth in 37 CFR 1.17(i) is authorized to be charged to Deposit Account No. 19-4375.

(2) All pending claims (claims 13-18) of the present application are believed to be directed to a single invention; if the Office determines that all the claims presented are not obviously directed to a single invention, the Applicants agree to

make an election without traverse as a prerequisite to the grant of special status.

(3) A pre-examination search has been made in the form of a search report in a counterpart PCT International Application (International Search Report dated September 25, 2005) and a search report in an office action dated February 14, 2006 in a counterpart Japanese application. Under MPEP 708.02, VIII, a search made by a foreign patent office satisfies the search requirement. An Information Disclosure Statement directed to the references cited in the ISR was filed on February 1, 2006 and an Information Disclosure Statement directed to the references cited in the Japanese Search Report was filed on May 4, 2006.

Also, a pre-examination search has been made, and an Information Disclosure Statement directed thereto is attached.

The field of search is:

Class 370, subclass 339;

Class 375, subclass 267, 299 and 347; and

Class 455, subclasses 101, 103, and 522.

Examiners Wellington chin and John Pezzlo were consulted for the above field of search.

(4) One copy each of the prior art deemed most closely related to the subject matter encompassed by the claims is of record in the form of the art cited in the Information Disclosure

Statement filed February 1, 2006, the Information Disclosure Statement filed May 4, 2006 and the Information Disclosure Statement filed herewith.

(5) The following is a detailed discussion of the art of record, and comments pointing out how the instant claimed subject matter is patentably distinguishable thereover.

A. Discussion of All References of Record

The S. Kurosaki et al. article, discussed at application page 1, line 12 et seq., discloses a MIMO (Multi Input Multi Output) technique employing plural antennas. The application at page 2, line 23 et seq. discusses a system based on the MIMO technology wherein the number of antennas that transmit modulated signals is changed according to the radio wave propagation environment and so forth. With this system, when four antennas are provided on the transmitting side, for example, four different modulated signals are simultaneously transmitted using all four antennas when the radio wave propagation environment is good, whereas two different modulated signals are simultaneously transmitted using only two antennas when the radio wave propagation environment is poor. In such system, the received signal level changes in accordance with a change of the number of transmitting antennas (that is, the number of transmit modulated

signals), resulting in possible large quantization error of an analog/digital converter in the receiving apparatus and reduced modulated signal reception quality due to lowered channel estimation precision and increased information data error rate.

WO 2002/103926 and US 2003/0043732 are correspondents of each other (cited under Categories Y and A in the ISR). They disclose a multi-channel communication system wherein available transmission channels are segregated into one or more groups, and the channels in each group are selected for use for data transmission. Each group may correspond to, for example, a respective transmit antenna. A weighting scheme is employed which "inverts" selected channels such that they achieve similar received SNRs, and only "good" channels in each group having SNRs at or above a particular threshold are selected and "bad" channels are not used. This enables the total available transmit power for the group to be distributed across the good channels in the group.

JP 11145932 and USPN 6,738,448 are correspondents of each other (cited under Category Y in the ISR) directed to a multi-rated delay multiplexing direct spread spectrum communication having a variable multiplicity in which the transmission power is made constant.

V. TAROKH, et al., "Space-Time Codes for High Data Rate Wireless Communication: Performance Criterion and Code Construction," and V. TAROKH, et al.; "Space-Time Block Codes from Orthogonal Designs," are discussed at application page 35, lines 34-45. These articles disclose a mobile communication system employing multiple transmit antennas, wherein data encoded by a channel code is split into n streams that are simultaneously transmitted using n transmit antennas, where the mobile unit has m antennas. The article discusses improved channel codes. The present invention can be implemented in a case where space-time coding is not performed, and can also be similarly implemented by applying the space-time block codes described in these articles.

The L. M. Davis, et al., article is cited in the Japanese office action for a MIMO system that makes the number of antennas variable according to the reception environment.

JP 2003 37536 (which corresponds to USPN 6,891,817) discloses a system of transmitting signals in parallel from a plurality of antennas (parallel transmission). The system provides for control of transmission power of search codes independently of that of control channels.

USPN 6,993,299 discloses a radio frequency signal transmission system having plural power amplifiers that amplify corresponding ones of a plural RF signals for transmission by

corresponding ones of plural antennas. The output power of each power amplifier that amplifies a RF signal for transmission is controlled according to changing requirements (e.g., the destination device and channel conditions).

USPN 6,785,520 discloses a wireless transmission system using plural antennas wherein the power of the signal output by of the plurality of transmit antennas is kept the same, in accordance with a technique to make the power equal to the total power of the transmit signal divided by the number N of transmit antennas from which the signal is to be transmitted.

USPN 7,042,955 discloses transmitting a signal and a frequency swept version of the same signal over diversity antennas at different power levels to reduce the depths of nulls normally seen in AWGN conditions when regular PSTD is utilized. In one aspect, a signal s_1 comprising a non-STS/OTD signal and a first STS/OTD signal belonging to an STS/OTD pair is split into two signals $s_1(a)$ and $s_1(b)$. The summed signal and the signal $s_1(a)$ are amplified and transmitted over a pair of diversity antennas. The amount of gain applied to the summed signal and the signal $s_1(a)$ may be equal or unequal such that the amplified summed signal and the amplified signal $s_1(a)$ are at approximately equal power levels.

B. Discussion of How the Claimed Invention Patentably Distinguishes over the References of Record

It is submitted that the references cited above, considered either alone or in combination, fail to disclose or suggest the claimed subject matter discussed below:

(a) a radio transmission method using plural antennas, wherein at least one antenna is used to transmit a first preamble which includes a signal point amplitude greater than a maximum signal point amplitude among signal point amplitudes of data symbols, and a number of antennas greater than the at least one antenna used to transmit the first preamble is used to transmit a second preamble which includes a signal point amplitude smaller than the signal point amplitude included in the first preamble (independent claim 13); or

(b) a radio transmission method using a first antenna and a second antenna, wherein at least one of the antennas is used to transmit a first preamble which includes a signal point amplitude greater than a maximum signal point amplitude among signal point amplitudes of data symbols, and the first antenna and the second antenna are used to transmit the second preamble which includes a signal point amplitude which is smaller than the signal point amplitude included in the first preamble (independent claim 14).

Various documents of record disclose use of plural antennas, such as the S. Kurosaki et al. article and the L. M. Davis, et al., article which teach changing the number of antennas that transmit modulated signals according to the channel environment. USPN 6,993,299 discloses controlling the output power of each power amplifier that amplifies a RF signal for transmission according to changing requirements (e.g., the destination device and channel conditions). USPN 6,785,520 discloses keeping the same power of the signal output by the plurality of transmit antennas, by making the power equal to the total power of the transmit signal divided by the number N of transmit antennas from which the signal is to be transmitted.

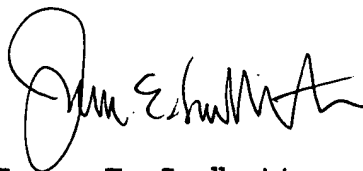
However, the art of record, alone or together, fails to teach or suggest relationships between the amplitudes of the first preamble (transmitted by a lower number of antennas) and the data symbols, and the second preamble (transmitted by a higher number of antennas) and the first preamble, as recited in the present claims.

It is submitted that the above-noted combinations of features of the independent claims are not taught or suggested by the combined teachings of the art of record, and thus the independent claims, and all claims dependent therefrom, are patentable.

Accordingly, in light of the foregoing discussion pointing out how the claimed invention distinguishes over the cited references, the Applicants respectfully submit that the inventions of all the presently pending claims are not anticipated by these references and would not have been obvious over any combination thereof.

Grant of special status in accordance with this petition is respectfully requested.

Respectfully submitted, ..



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Date: July 25, 2006

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